**Biology 3201 - Unit 1: Maintaining Dynamic Equilibrium II**

**Objectives: Chapter 12: Pages 390-419**

Explain the basic structure and function of the central nervous system (brain and spinal cord).

Explain how the skull, meninges and cerebrospinal fluid protect the nervous system.

Describe the basic functions of a peripheral nervous system. Include:

i) autonomic (sympathetic and parasympathetic)

ii) somatic

Identify requirements necessary for a nervous response to occur. Include:

i) sensory receptors (skin, eye, ear)

ii) impulse transmission (neuron)

iii) interpretation and analysis of impulses (brain and spinal cord)

iv) effectors (muscle, gland)

Define a reflex arc.

Describe the following components of the neuron and explain the function of each part.

i) dendrite

ii) cell body

iii) axon

iv) axon terminal

v) Schwann cells (myelin sheath and nodes of Ranvier)

Describe the functions of sensory neurons, motor neurons and interneurons.

Describe the following Technologies:

i) MRI

ii) EEG

iii) CAT scan

iv) PET scan

Explain the basic structure and function of the brain using the following terms:

i) cerebrum

ii) cerebellum

iii) medulla oblongata

iv) thalamus

v) hypothalamus

vi) midbrain

vii) pons

viii) corpus callosum

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Describe the transmission of an impulse along the length of a neuron. Include:

i) the ion distribution of the neural membrane (rest, depolarization, repolarization)

ii) threshold

iii) action potential

iv) all-or-none response

Identify the role of certain compounds to neuron function (oxygen, glucose, ATP, sodium ions)

**Core Lab #1: The Nervous System and Reflex Responses**

List and explain the methods used to treat stroke and spinal cord injury.

Explain the synapse.

Describe the transmission of an impulse along the length of a neuron, across a synapse or neuromuscular junction, and the effects of the transmitters involved

i) acetylcholine

ii) noradrenaline

iii) glutamate

iv) GABA

v) dopamine

vi) serotonin

Explain the critical role of cholinesterase in nerve transmission.

Describe the following disorders linked to the nervous system, and their effect on homeostasis of the system and the organism as a whole.

i) Multiple Sclerosis

ii) Alzheimers Disease

iii) Parkinsons Disease

iv) Meningitis

v) Huntingtons Disease

Describe how the use of prescription and non-prescription drugs can have a role in maintaining or disrupting homeostasis using the following examples: (handout accompanying)

i) anaesthetics

ii) prescription drugs (OxyContin, Valium, Ritalin)

iii) illegal drugs (marijuana, ecstasy, cocaine)

iv) legalized drugs (alcohol, nicotine, caffeine)

Debate the merits of using drugs for treatments of nervous disorders against the long-term effects.

Debate the legalization of marijuana for medicinal purposes.

Explain how the eye as a sense organ helps maintain homeostasis.

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Describe the general function of the eye

i) lens

ii) iris

iii) retina

iv) cornea

v) choroid layer

vi) fovea centralis

vii) rods

viii) cones

ix) pupil

x) blind spot

xi) optic nerve

xii) aqueous humour

xiii) vitreous humour

Trace the path of light through the eye and explain how the amount of light entering the eye is regulated.

Briefly describe the following eye disorders

i) glaucoma

ii) cataracts

iii) astigmatism

iv) myopia

v) hyperopia

Explain the treatments for eye disorders and when theyre used

i) corneal transplant

ii) laser surgery

iii) corrective lenses

iv) lens replacement

Using the following terms, describe the general structure and function of the ear:

i) pinna

ii) tympanic membrane

iii) ossicles (malleus, incus, stapes

iv) eustachian tube

v) semicircular canals

vi) cochlea

vii) auditory nerve

Trace the pathway of sound through the ear

Briefly describe the following ear disorders: conduction deafness and nerve deafness, and the treatments used for these disorders (eustachian tube implants, hearing aids)

Consider how medical treatments for visual and auditory disorders may impact a sense of exclusion, and explore the idea of mandatory organ donation.